The SIXTH
ANNUAL REPORT
of the
WALTER and ELIZA HALL
INSTITUTE of RESEARCH
in
PATHOLOGY
and
MEDICINE

STAFF.

Director: C. H. Kellaway, M.C., M.D., M.S.(Melb.), M.R.C.P. (London).

First Assistant: Gordon Cameron, M.B., B.S.(Melb.).

Bacteriologist and Serologist: Miss F. E. Williams.

Electro-cardiographist: Miss Cecil Maudsley, B.Sc.(Melb.).

Director's Secretary and Librarian: Miss Bertha Barrett.

Cancer Research Scholar.

Thomas Cherry, M.D., M.S.(Melb.).

Part-time Workers.

H. R. Dew, M.B., B.S.(Melb.), F.R.C.S.(Eng.), F.A.C.S., Honorary Out-Patient Surgeon to the Melbourne Hospital.

J. F. Chambers, M.B., B.S., M.R.C.P.(London), Honorary Physician to the Austen Hospital, Medical Clinical Assistant to the Alfred Hospital.

J. Brown, M.D., B.S.(Melb.), F.R.C.S.(Eng.), Acting Honorary Out-Patient Surgeon to the Alfred Hospital.

A. B. P. Amies, B.D.Sc.

S. O. Cowen, M.D.(Melb.), Honorary Out-Patient Physician to the Melbourne Hospital.

Gordon Shaw, D.S.O., F.R.C.S.(Eng.), Honorary Out-Patient Surgeon to St. Vincent's Hospital.

Allan Hailes, D.S.O., F.R.C.S.(Eng.), Honorary Out-Patient Surgeon to the Melbourne Hospital.

W. W. M. Johnston, D.S.O., M.D.(Melb.), Honorary Out-Patient Physician to the Melbourne Hospital.

Members of the Staff Appointed by the Hospital.

Professor Peter MacCallum, M.C., M.A., M.Sc., M.B., Ch.B., D.Ph., Honorary Pathologist to the Melbourne Hospital.

C. H. Mollison, M.B., B.S.(Melb.), M.R.C.S.(Eng.), Honorary Assistant Pathologist to the Melbourne Hospital.

Keith Ross, M.B., B.S.(Melb), Senior Resident Pathologist.

A. Ahern, M.B., B.S.(Melb.), Pathological Registrar.

Miss B. Splatt, B.Sc.(Melb.), Biochemist.

THE SIXTH ANNUAL REPORT OF THE WALTER AND ELIZA HALL INSTITUTE OF RESEARCH IN PATHOLOGY AND MEDICINE.

Apart from the general work of the Institute the two most outstanding events of the year have been the appointment of the Director to the Honorary Staff of the Hospital as a specialist physician and the appointment of a First Assistant to the Institute. The former is important because it will enable the Institute to keep more closely in touch with the clinical aspects of research problems in medicine and the allotment of a small number of in-patient beds to the care of the Director is invaluable for the investigation and treatment of special cases.

The need of a First Assistant has been apparent for some time, both to take charge of the Institute during any necessary absence of the Director and to develop additional aspects of research. The appointment of Dr. Gordon Cameron to this post has been rendered possible by the addition of £750 to our annual income. This has been achieved by the generosity of the Walter and Eliza Hall Trust, who are contributing an additional £500 per annum for the next three years, and by the action of the University Council in raising a capital sum sufficient to yield an annual interest of £250. This they did by using the Clinical Research Fund as a nucleus and issuing an appeal to obtain £2600. The Appeal Fund was generously supported, and we wish to thank the donors, a list of whom may be found in an appendix to this report.

The personnel of the Institute has undergone several changes this year. Dr. Lucy Bryce left us in July to go abroad. In February Miss Maud Cowen resigned the position of bio-chemist, which she had held for three years, and at present there is no bio-chemist on the Institute Staff. Dr. G. F. S. Davies, who was associated with the Director in several investigations during the last year, has recently been appointed Stewart Lecturer in Pathology at the University of Melbourne. Dr. Wanliss resigned the Grice Cancer Research Scholarship in October, and no new appointment was made until March. Dr. Thomas Cherry, the present Scholar, is carrying out part of his researches at the Veterinary Department of the University and part at this Institute. The need for some competent person to act as Librarian and as Secretary to the Director was met in August by the appointment of Miss Bertha Barrett.

Dr. Burnet, who during the last two years held the post of Senior Resident Pathologist, has left us to further his researches in England. We will greatly feel the loss of this able and enthusiastic worker. Dr. Keith Ross has been appointed to succeed him.

THE WORK OF THE INSTITUTE.

Hydatid Disease.—A good deal of further work has been done on this disease during the last twelve months. Mr. Dew has continued his investigations on the life history of the hydatid parasite in man and other animals. He has studied the early stages of the development of hydatid cysts in pigs and finds that the embryo reaches the liver by way of the portal vein within twelve hours after feeding the animal with eggs. A hydatid follicle is rapidly produced by the local reaction of the liver tissue. The reaction of the host is manifested by striking eosinophil accumulation, and in some cases this cellular reaction overcomes the parasite in the earlier stages. Cysts usually grow in a spherical form, but tend to take the line of least resistance so that pouching caused by the proximity of bands of fibrous tissue, blood vessels or bile ducts is not common. Brood capsule formation has not been observed in cysts up to the age of five months. Part of this work was carried out at the Veterinary School at the University. Mr. Dew has also placed on record in two interesting papers his studies concerning daughter cyst formation in man. In this work he has brought forward a great deal of evidence in support of Dévé's view that daughter cyst formation follows some injury of the cyst and draws important conclusions in regard to the surgical treatment of hydatid disease.

Mr. Dew, Dr. Kellaway and Miss Williams have investigated the value of the early phase of the intradermal skin reaction in the diagnosis of infestation in man. The test is of extreme value in preoperative and uncomplicated cases. This work was the subject of the Director's address to the First Divisional Meeting of the British Medical Association (Victorian Branch) at Warrnambool this year. The general question of the immunological reactions in hydatid disease was discussed at a scientific meeting of the British Medical Association in November last at which Mr. Dew read a paper.

Miss Williams has carried out nearly a thousand immunological tests in suspected cases of hydatid disease during the year. Dr. Lucy Bryce, Dr. Kellaway and Miss Williams studied the various antigens used in these immunological tests and concluded that fresh hydatid fluid was most generally useful. They found that it could function also as an anaphylactic antigen and showed that the specific precipitin in the sera of infested patients resembled other precipitating sera in its inactivation by heat with the formation of a "precipitoid," though this took place at a somewhat lower temperature than is the case in other precipitating sera. Alcoholic extract of scolices was found to be useful only for complement fixation, and attempts to produce a dry stable antigen were unsuccessful.

Publications.—H. R. Dew—

"The Histogenesis of the Hydatid Parasite (Taenia Echinococcus) in the Pig." Medical Journal of Australia, Jan. 31, 1925.

"Daughter Cyst Formation in Hydatid Disease. Some Observations on its Causation and Effects." (In the press).

H. R. Dew, C. H. Kellaway and F. Eleanor Williams—

"The Intradermal Reaction in Hydatid Disease and its Clinical Value." Medical Journal of Australia, May 9, 1925.

C. H. Kellaway—

"The Utility of the Casoni Reaction in the Diagnosis of Hydatid Disease." Medical Journal of Australia, April 25, 1925.

Lucy M. Bryce, C. H. Kellaway and F. Eleanor Williams—

"A Study of Hydatid Antigen." Australian Journal of Experimental Biology and Medical Science, Vol. 1, 1924, p. 77.

Renal Disease.—Some aspects of renal disease have been studied this year. Dr. Kellaway, with Dr. Davies and Miss Williams, attempted to determine the source of the protein in the urine in experimental uranium nephritis by means of cross fixation, absorption and anaphylactic experiments. The methods used necessitated a preliminary study of organ specificity, and it was found that, whereas extracts of liver and kidney could be differentiated by cross fixation and absorption, no specificity was displayed in regard to anaphylaxis. It was, however, easy to differentiate both these extracts from serum by means of the sensitive plain muscle of guineapigs. In acute uranium nephritis, where the damage is predominantly tubular, there is present in the urine a definite proportion of soluble protein other than that derived from the plasma and apart from casts and epithelial debris.

Other studies by Dr. Kellaway, Dr. Brown and Miss Williams not yet completed have been concerned with the experimental production of ascending infection in the urinary tract. Dr. Kellaway and Mr. Gordon Shaw are at present associated in a study of the function of the ureteric orifices.

Publications.—G. F. S. Davies, C. H. Kellaway and F. Eleanor Williams—

"A Study in Organ Specificity." Australian Journal of Experimental Biology and Medical Science, Vol. 2, 1925, p. 117.

C. H. Kellaway, G. F. S. Davies, and F. Eleanor Williams—Williams—

"The Source of the Protein in the Albuminuria of Experimental Nephritis." (In the press).

Bacteriophage.—Dr. F. M. Burnet was working during the latter half of last year on the bacteriophages and was chiefly concerned with those forms which attack Bacillus Coli and with the acquirement of resistance to their action by various strains of this bacillus. Two papers on this work have been published in the Journal of Pathology and Bacteriology in one of which he presents an interesting view of the bacteriophage activity. This work followed directly his observations on the agglutinins in typhoid fever in which he showed that sera from infested patients contained two independent agglutinins, whereas in persons inoculated subcutaneously with typhoid vaccines only one type of agglutination could be demonstrated.

Publications.—F. M. Burnet—

"Observations on the Agglutinins in Typhoid Fever." British Journal of Experimental Pathology, Vol. 5, 1924, p. 251.

"The Nature of the Acquired Resistance to Bacteriophage Action." Journal of Pathology and Bacteriology, Vol. 28, 1925, p. 407.

"The Conditions Governing the Appearance of Taches Vierges in Bacteriophage Activity." Ibid, p. 419.

The Action of Light on Media and the Effect of Dyes on Bacterial Growth.—Dr. Burnet has also made some interesting observations on the inhibition of the growth of aerobic organisms when cultivated on media which has been exposed to light. He attributes this inhibition to the presence of traces of peroxide in the media and finds that this can be neutralised by diffusible products of the growth of certain organisms. A similar inhibition can be observed in plates containing potassium cyanide and can be removed in the same way. His experiments with dyes also support his conclusions in regard to the production by organisms of diffusible reducing substances and suggest that the dyes act by rendering the organism sensitive to traces of peroxide produced by their own activity. Some of these experiments, through the courtesy of Professor Osborne, were carried out in the Physiology Department at the University.

Publications.—F. M. Burnet—

"Hydrogen Peroxide and Bacterial Growth." Australian Journal of Experimental Biology and Medical Science, Vol. 2, 1925, p. 65.

"A Note on the Effect of Dyes on Bacterial Growth." Australian Journal of Experimental Biology and Medical Science." Vol. 2, 1925, p. 77.

Pigment Metabolism and Blood Diseases.—Miss Maud Cowen carried out the Van den Bergh test in a large series of cases of jaundice and Dr. S. O. Cowen analysed the results, and concluded that the test is of value in detecting minor grades of jaundice, in indentifying haemolytic jaundice and in establishing the diagnosis between haemolytic and non-haemolytic anaemia. Dr. Cowen has also put on record an interesting case of Purpura Haemorrhagica in which splenectomy caused very considerable improvement, together with a critical survey of some of the experimental evidence concerning the value of splenectomy in this condition.

Publications.—Maud Cowen and S. O. Cowen—

"The Value of the Van den Bergh Reaction in the Clinical Study of Jaundice." Medical Journal of Australia, Feb. 21, 1925.

S. O. Cowen—

"Splenectomy in Essential Thrombocytopenic (Haemorrhagic) Purpura." (In the press).

Internal Secretion.—Dr. Gordon Cameron is working with Mr. Amies on changes in the oestrous cycle which follow the administration of thyroid extract. Before joining the Staff, Dr. Cameron had already made some observations on this subject at the Pathological Department of the University, and the work is being completed here. Dr. Cameron has also commenced an investigation concerning the occurrence of pancreatic regeneration.

Cancer Research.—Dr. Marion Wanliss, the Cancer Research Scholar concluded her studies on malignant disease of the uterus before leaving us to go abroad. Dr. Thomas Cherry, who has recently made several statistical studies of the relation between tuberculosis and cancer, was appointed Grice Scholar under rather different terms than those holding for previous scholars, and his appointment was rendered possible by a subsidy from the Commonwealth Government in addition to that already made by the State Government of Victoria. Dr. Cherry is working partly at the Veterinary School of the University and partly at this Institute and the first phase of his investigation is concerned with the action of Bacillus Tuberculosis on granulation tissue produced by certain irritants.

Publication.—Marion B. Wanliss—

"Malignant Disease of the Uterus." Medical Journal of Australia, Nov. 22, 1924.

Tissue Culture.—Miss Williams has been going on with her experiments in tissue culture and has succeeded in keeping tissues alive and actively migrating for long periods, but has not yet been able to get sufficiently regular growth in saline to make the method really useful for research purposes.

Cystitis Cystica.—Mr. Allan Hailes and Dr. Burnet had the opportunity of studying a case of this rather rare disease which was associated with severe haematuria. The interest of the condition lay in the fact that the patient came from a region in Victoria which is affected with a red-water disease of cattle of unknown aetiology, and it seemed possible that the disease in the patient might have the same causation. Mr. Hailes and Dr. Burnet visited the district in question and investigated a large number of specimens from cases of the disease in cattle. Their histological studies, however, revealed the fact that the two conditions were unlikely to be identical and that the human case was similar to those which have been studied in Europe by Stoerk and others.

Publication.—W. A. Hailes and F. M. Burnet—

"A Case of Cystitis Cystica Associated with Severe Haematuria." (In the press).

Routine Work.—A great deal of serological routine work has as usual been done this year. In addition to a large series of special Wassermann tests, many complement fixation tests for tuberculous and gonococcal infections have been done. Dr. Chambers has carried out all the routine basal metabolic investigations in cases of thyroid disease and these have entailed an enormous amount of careful and accurate work. The routine pathological work of the Hospital has been carried on by the Senior Resident Pathologist and the Pathological Registrar, and Dr. Mollison, the Honorary Assistant Pathologist to the Hospital, has, as in previous years, always been available to help and advise us on difficult questions of morbid histology. Dr. Johnston, with the Director and Miss Williams, has investigated by Rosenau's methods several cases of focal infection.

Biochemistry.—Apart from the routine biochemical work of the Hospital, Miss Splatt assisted by Miss Maudsley has carried out a number of special investigations in cases of interest and has in addition helped in some of the Institute researches. For any serious attack on the numerous important problems of experimental medicine the appointment of a whole-time biochemist will be necessary.

Electrocardiograph Department.—We are now well into the second year of Dr. Turnbull's guarantee for the Electrocardiograph Department and there seems no immediate prospect of its becoming self-supporting. It seems likely then that it will be necessary for the Hospital to take over this part of its routine work at a later stage. During the last year Miss Maudsley has taken 142 electrocardiographs from Hospital patients and 86 from private cases. She has also given much attention to the optical and photographic work of the Institute.

Other Activities.—The arrival of the new Professor of Pathology has given a fresh impetus to the morbid anatomical side of the work, and he has given at this Institute weekly demonstrations which have been very largely attended by the members of the Honorary Staffs of this and other hospitals as well as by many other medical practitioners who greatly appreciate the opportunity of having presented to them modern views concerning the pathology of disease.

The Director is representing the Institute on two committees. The first is one appointed by the Faculty of Medicine and the British Medical Association to advise the Faculty and the Council of the University on the application of the £10,000 recently given by the Edward Wilson Trust ("The Argus") for the purpose of investigating the Maternal Mortality and Morbidity in Victoria and of decreasing their incidence if possible. The second is an advisory committee appointed by the City Health Department to control the distribution of serum for the treatment of cases of poliomyelitis. This disease has become very prevalent in the last few months, and it has been thought desirable to lay in a large stock of the serum. On being approached by the City Health Department, Dr. Kellaway agreed to co-operate with them in any way possible. Dr. MacNamara had been appointed by the City Council to supervise the work and it was arranged that the patients who were willing to be donors should be bled at the Institute, the further preparation of the serum being carried out at the Commonwealth Serum Laboratories. Miss Williams, Dr. Burnet and Dr. Ross have been associated with Dr. MacNamara in this work and a large amount of serum is now available.

The Museum.—Dr. Cameron and Dr. Ross are busily engaged in building up the museum of pathological specimens which was commenced by Mr. Dew some years ago, and by the end of the present year there should be available an excellent teaching collection which is already valuable, and will become more so, to members of the Hospital Staff in relating pathology to the clinical problems of medicine and surgery.

Teaching.—The Director of the Institute has recently been appointed an Honorary Lecturer in Pathology at the University, and in addition is acting as an honours examiner in Clinical Pathology. The practice initiated by Dr. Patterson of giving during the second and third terms a series of voluntary lectures to fifth year students on pathology, dealt with from the physiological point of view, is being continued by the present Director. A new departure was made this year in arranging for the attendance of fifth year students in the laboratory of the Pathological Registrar where most of the routine clinical pathology of the Hospital is carried out. Each pair of students attends daily for one week. This arrangement, though not adequate, will ensure that the students are given some opportunity of acquiring a first-hand acquaintance with clinical pathology.

The Kidney in Health and Disease was the subject of the last year's advanced course arranged by the Melbourne Permanent Committee for Post-Graduate Work, and the first four lectures were given by the Director, who also gave a similar series of lectures in the Post-Graduate Course at Sydney.

The Library.—Although there has been the nucleus of a library in the Institute since 1920, formed by the late Dr. Mathison's collection of medical works, it is only this year that a really up-to-date scientific library has been acquired. In order to house this the old Board room, which was never used for the purpose originally intended, has been converted into an attractive and capacious library where members of the Staff find it most convenient to be able to read and write without fear of disturbance. A bronze tablet at the entrance commemorates the fact that it owes its existence to the generosity of the Edward Wilson ("The Argus") Trust. Thanks should also be tendered to Mr. Blackett, the Honorary Architect, who designed the book stacks and furniture and saw that the work was properly carried out. Some thirty journals are being subscribed to and an attempt is being made to obtain complete series of these. Miss K. Baverstock, the Librarian of the National Institute for Medical Research, London, is acting as our agent in an honorary capacity, and our thanks are due to her and to the Medical Research Council for permitting her to act in this capacity. Through her we have secured a large number of volumes which would have been impossible to procure in this country.

We are greatly indebted to the following for gifts of books and journals:—

The British Medical Association, Melbourne.
The British Medical Association, Brisbane.
The Medical Research Council, London.
The University of Melbourne.
The Société Royale des Sciences Medical et Naturel de Bruxelles.
Sir Henry Maudsley.
The late Dr. A. Cowen.
Dr. Ivan Connor.
Dr. Hume Turnbull.
Mr. Alan Newton.
Dr. Lawton.
Dr. Newman Morris.
Dr. A. H. Thwaites.
Dr. P. Dane.
Dr. Grover.
Dr. J. M. Lewis.
Dr. Zwar (subscription).
Dr. Johnston (subscription).

Equipment, etc.—A considerable improvement has been made in the appearance of the interior of the building. The walls of several of the laboratories have been painted, the Director's office has been re-decorated and the walls of the remainder of the building have been thoroughly cleaned. The passages and stairways are being painted, and their ventilation improved by altering the windows over the stairways. The animal accommodation in the basement has been enlarged and much improved during the year.

Another innovation which has been needed for a long time was the installation of a cold storage apparatus which could take the place of the numerous ice chests scattered about the building. The storage of media, sera, etc., in ice chests is expensive, wasteful and laborious, particularly in a building unequipped with lifts. We have, therefore, installed a kelvinator at the cost of £200, which is proving thoroughly efficient. We were able to do this through the generosity of the Felton Trust, who gave us the sum of £500 to be expended on research. The remainder of this money has been used in the general research expenditure of the Institute.

Finances.—In presenting the estimates for the forthcoming year it will be noted that the contemplated expenditure exceeds our present income by £760. No allowance has been made for the appointment of a biochemist, whose services are much needed both to develop our present work and to initiate independent researches.

ESTIMATES, 1925-26.

Income.

Trustees	£3100	
University	750	
Interest	120	
Donations and Fees (against Apparatus Account)	130	£4100

Expenditure.

Salaries—			
Director	£1000		
Directors' Insurance Policy	75		
First Assistant	750		
Bacteriologist	450		
Director's Secretary and Librarian	175		
Research Grants	200		
Secretarial	110		
Senior Laboratory Attendant	338		
Animal Attendant	260		
3 Junior Laboratory Attendants	234		
2 Cleaners	208	£3800	
Materials		450	
Apparatus		200	
Fittings and Equipment		100	
Sundries		250	
Repairs to Buildings		50	
Repairs to Apparatus		10	£4860
Deficiency			£760

List of Subscribers to the Fund in Response to the Appeal.

	£	s.	d.
Fred Knight	1000	0	0
A.N.T.	500	0	0
H. V. McKay	200	0	0
Sir W. McBeath	100	0	0
Myers (Melb.) Pty. Ltd.	100	0	0
Anonymous	100	0	0
W. D. & H. O. Wills (Aust.) Ltd., The States Tobacco Co. Pty. Ltd., The British Australasian Tobacco Co. Pty. Ltd.	100	0	0
A. T. Danks	50	0	0
Mrs. A. Brown	50	0	0
Dr. S. V. Sewell	50	0	0
Mrs. Jessie Fraser	50	0	0
Thomas Baker	50	0	0
Mrs. Charles Mills	50	0	0
Dr. Dunbar Hooper	26	5	0
The British Medical Association	26	5	0
Sir George Syme	25	0	0
W. P. Shaw	25	0	0
Dr. H. Hume Turnbull	25	0	0
B.M.M.	25	0	0
Messrs. Cuming, Smith & Co.	25	0	0
Miss J. C. Turnbull	25	0	0
John Turnbull	25	0	0
Hon. J. A. Boyd	25	0	0
The Trustees, Henry Berry Fund	25	0	0
Mrs. Alston	21	0	0
M. B. Armstrong	20	0	0
C. Armstrong	20	0	0
J. P. Jones, M.L.C.	10	10	0
Dr. B. T. Zwar	10	10	0
Dr. Julian Smith	10	10	0
Dr. K. Hiller	10	10	0
Dr. S. O. Cowen	10	10	0
J. G. Latham	10	10	0
Dr. B. Kilvington	10	10	0
Dr. A. V. M. Anderson	10	10	0
Mrs. Hume Turnbull	10	10	0
Dr. Alan Newton	10	10	0
Dr. and Mrs. W. R. Grove	10	10	0
Geoffrey Syme	10	10	0
Sydney Stott	10	10	0
Messrs. Kitchen & Sons	10	10	0
E. L. Yencken	10	0	0
Edward Naylor	10	0	0
J. H. J. Symon	10	0	0
Dr. F. W. Grutzner	5	5	6
Dr. H. Saunders	5	5	0
Sir John MacFarland	5	5	0
Mrs. R. Hunter	5	5	0
D. York Syme	5	5	0
H. G. MacRoberts	5	5	0
Dr. C. H. Kellaway	5	0	0
Dr. S. C. Jamieson	3	3	0
Dr. J. Newman Morris	3	3	0
Dr. H. M. Hewlett	3	3	0
Dr. V. Hurley	3	3	0
Miss I. Taylor	3	3	0
Dr. Margaret Hutchins	2	2	0
Dr. J. H. Downing	2	2	0
Alfred Bright	2	2	0
G.D.	2	0	0
S. R. Cole	1	1	0
A. S. Burgess	1	1	0
Dr. A. P. Derham	1	0	0
Total	£2979	3	6